

Load-Resistant Coaxial Transmission Line

Abstract

A transmission line for downhole tools that make up all or part of a tool string for drilling and production of oil, gas, and geothermal wells that can withstand the dynamic gravitational forces and other accelerations associated with downhole excavations. The transmission line comprises a metal tube, or outer conductor, that houses a coaxial wire inner conductor. A non-metallic dielectric material is interposed between the inner and outer conductors. The outer and inner conductors and the dielectric are sufficiently compressed together so that independent motion between them is abated. Compression of the components of the transmission line may be achieved by drawing the transmission through one or more dies in order to draw down the outer conductor onto the dielectric, or by expanding the inner conductor against the dielectric using a mandrel or hydraulic pressure. Non-metallic bead segments may be used in aid of the compression necessary to resist the dynamic forces and accelerations of drilling.